



**UNIVERSITI PUTRA MALAYSIA**

***COMPUTERISED COGNITIVE REMEDIATION THERAPY IN COGNITIVE  
IMPROVEMENT AND PSYCHOSOCIAL FUNCTIONING IN FIRST  
EPISODE PSYCHOSIS OUTPATIENTS IN KUALA LUMPUR AND  
SELANGOR, MALAYSIA***

**HILWA ABDULLAH @ MOHD. NOR**

**FPSK(P) 2018 36**



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BERILMU BERBAKTI

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SELANGOR, MALAYSIA**

By

**HILWA ABDULLAH @ MOHD. NOR**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
Fulfillment of the Requirements for the Degree of Doctor of Philosophy**

**April 2018**

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## **DEDICATION**

*To*

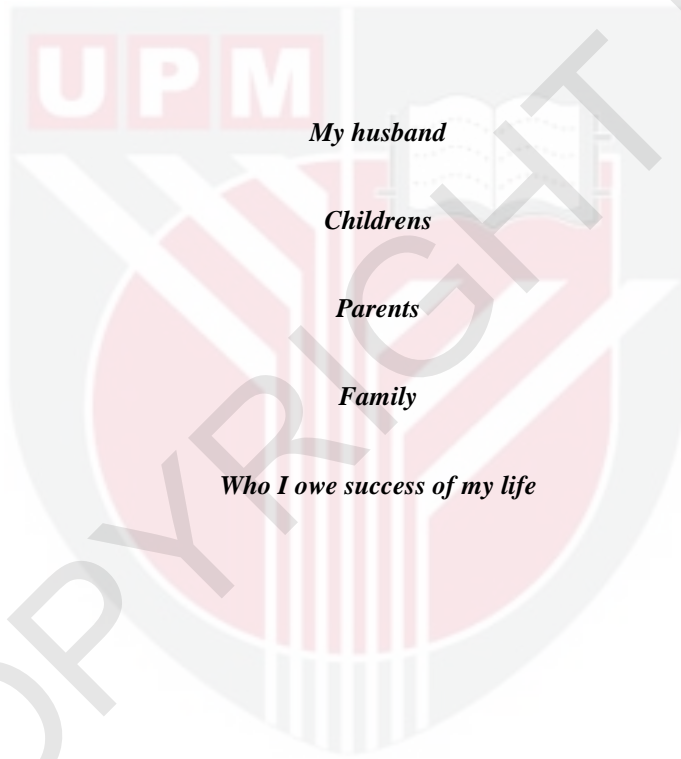
*My husband*

*Childrens*

*Parents*

*Family*

*Who I owe success of my life*



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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

**COMPUTERISED COGNITIVE REMEDIATION THERAPY IN COGNITIVE IMPROVEMENT AND PSYCHOSOCIAL FUNCTIONING IN FIRST EPISODE PSYCHOSIS OUTPATIENTS IN KUALA LUMPUR AND SELANGOR, MALAYSIA**

By

**HILWA ABDULLAH @ MOHD. NOR**

**April 2018**

**Chair: Associate Profesor Muhammad Hanafiah bin Juni, PhD**  
**Faculty: Medicine and Health Sciences**

Psychosis is one of the most prominent symptoms of mental illness. It has a tremendous devastating impact not only on the lives of persons with the disorder, but also society as a whole. Early identification and intensive treatment has been the focus of treatment for people with first episode psychosis (FEP). Cognitive remediation is an evidence-based behavioural intervention aiming to improve cognitive functioning and psychosocial functioning with a proven efficacy and durability over time. This study aimed to validate the instrument of the Brief Assessment on Cognition in Schizophrenia – Malay version (BACS-M) and evaluate the effectiveness of the computerised cognitive remediation therapy in improving cognitive and psychosocial functioning in patients with first episode psychosis. This research was conducted in two phases. Phase 1 of this study was performed to test the reliability and validity of the BACS-M. Data were collected from 26 outpatients with schizophrenia who had given written informed consent. Tests included in BACS-M were as follow; verbal fluency, verbal memory list learning, token motor test, symbol coding, digit sequencing task, and Tower of London. Meanwhile, Phase 2 of this study were to investigate the effectiveness of computerized cognitive remediation therapy for FEP in Malaysia by comparing patients receiving 10 individual sessions of CCRT (n=34) and being on Wellness Programme (active comparator) (n= 20). Participants in the intervention group were patients from the Psychiatric Clinic of Universiti Putra Malaysia (UPM) and the session of CCRT were conducted at the Hospital Kajang. The control group participants were outpatients from the Department of Psychiatry, Universiti Kebangsaan Malaysia Medical Centre and received eight sessions of Wellness Program. The mixed between-within subject ANOVA was used to compare mean difference of the BACS-M score between the CCRT and WL groups at baseline, post-test (week 10) and 3 month of follow-up (week 22). Both groups were given identical assessment which were BACS-M, PSP and PANSS at baseline, post-treatment and

three month follow up. The mean duration of completion for the BACS-M was 39.27 min (S.D. = 9.03 min). The BACS-M showed high test-retest reliability (ICC = 0.89) and the BACS-M composite score was significantly correlated with all primary measures of the BACS-consecutive assessments. A series of repeated measures of ANOVA yielded no significant difference in the cognitive scores as measured by BACS-M, however the scores of all the cognitive domains were better much improved across over time in baseline, post-treatment and three months follow-up. There was a slight improvement in psychosocial functioning in the WL group than in the CCRT group. Small sample size, intensity of treatment and changes in mental health during the course of the study may have impacted the results.

**Keywords:** Early onset psychosis, cognitive impairment, cognitive functioning, psychosocial functioning, computerised cognitive remediation therapy, cognitive rehabilitation

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**TERAPI REMEDIASI KOGNITIF SECARA BERKOMPUTER DALAM  
MENINGKATKAN KOGNITIF DAN KEFUNGSIAN PSIKOSOSIAL DALAM  
KALANGAN PESAKIT LUAR PSIKOSIS *FIRST EPISODE* DI KUALA  
LUMPUR DAN SELANGOR, MALAYSIA**

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Psikosis merupakan satu kecelaruan mental. Psikosis bukan sahaja memberi kesan yang mendalam terhadap kesihatan mental individu yang mengalaminya tetapi juga kepada keluarga terdekat pesakit psikosis itu sendiri. Pengenalpastian pada peringkat awal dan rawatan intensif telah menjadi tumpuan rawatan untuk pesakit psikosis episod pertama (FEP). Remediasi kognitif merupakan satu rawatan berasaskan bukti yang bertujuan untuk meningkatkan kefungsi kognitif dan psikososial. Kajian ini bertujuan untuk mengesahkan instrumen *Brief Assessment of Cognition in Schizophrenia* - versi Melayu (BACS-M) dan untuk melaksanakan dan menilai keberkesanan terapi remediasi kognitif secara berkomputer pada pesakit psikosis episod pertama. Kajian ini dijalankan dalam dua fasa. Fasa 1 kajian ini dijalankan untuk menguji kebolehppercayaan dan kesahan BACS-M. Data dikumpul dari 26 pesakit luar dengan skizofrenia yang telah memberikan kebenaran bertulis secara bertulis. Ujian yang dimasukkan ke dalam BACS-M adalah seperti berikut; kelancaran lisan, pembelajaran senarai lisan ingatan, ujian motor token, pengekodan simbol, tugas penjujukan angka, dan Menara London. Sementara itu, Fasa 2 kajian ini bertujuan untuk mengkaji keberkesanan terapi remediasi kognitif secara berkomputer (CCRT) untuk FEP di Malaysia dengan membandingkan pesakit yang menerima 10 sesi individu CRT berkomputer ( $n = 34$ ) dan berada pada program kesejahteraan yang menasaskan pengurusan berat badan (komparator aktif) ( $n = 20$ ). Peserta dalam kumpulan CCRT merupakan pesakit dari Klinik Psikiatri Universiti Putra Malaysia (UPM) dan sesi CCRT telah dijalankan di Hospital Kajang. Peserta kumpulan kawalan adalah pesakit luar dari Jabatan Psikiatri, Pusat Perubatan Universiti Kebangsaan Malaysia (UKMMC). Mereka adalah pesakit yang didiagnosis dengan psikosis episod pertama dan diberi lapan sesi program pengurusan berat badan. Campuran antara dalam subjek ANOVA digunakan untuk membandingkan perbezaan min skor BACS-M antara kumpulan intervensi dan kawalan di peringkat awal, selepas ujian (minggu ke-10) dan 3 bulan susulan (minggu ke-22). Khususnya, kajian ini bertujuan untuk mengkaji sama ada CCRT akan meningkatkan defisit kognitif serta fungsi psikososial. Purata tempoh



penyelesaian bagi BACS-M adalah 39.27 min (S.D. = 9.03 min). BACS-M menunjukkan kebolehpercayaan ujian ujian yang tinggi (ICC = 0.89) dan skor komposit BACS-M dikaitkan dengan semua langkah utama penilaian BACS-berturut-turut. Hasil kajian mendapati tiada perbezaan yang signifikan dalam skor kognitif seperti yang diukur oleh BACS-M, namun skor semua domain kognitif lebih baik dari masa ke masa bagi kedua-dua kumpulan rawatan, selepas rawatan dan tiga bulan rawatan susulan. Terdapat sedikit peningkatan dalam fungsi psikososial yang diukur oleh PSP dan PANSS dalam kumpulan WL daripada kumpulan CCRT. Saiz sampel kecil, intensiti rawatan dan perubahan dalam kesihatan mental semasa kursus mungkin memberi kesan kepada keputusan.

**Kata kunci:** psikosis episod pertama, kecacatan kognitif, kefungsi kognitif, kefungsi psikososial, terapi remediasi kognitif secara berkomputer, rehabilitasi kognitif, skizofrenia

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I certify that a Thesis Examination Committee has met on (date of viva voce) to conduct the final examination of Hilwa Abdullah @ Mohd. Nor on her thesis entitled "The effectiveness of computerised cognitive remediation therapy in improving cognitive and psychosocial functioning in first episode psychosis patients in Kajang Hospital and Universiti Kebangsaan Malaysia Medical Centre" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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## LIST OF ABBREVIATIONS

BACS	Brief Assessment of Cognition in Schizophrenia
BACS-M	Brief Assessment of Cognition in Schizophrenia-Malay version
BFP	Brain Fitness Program
CBT	Cognitive behavioral therapy
CREPS	Computerized Cognitive Remediation Project for Schizophrenia
CCRT	Computerized Cognitive Remediation Therapy
CAI	Cognitive Assessment Interview
CRT	Cognitive Remediation Therapy
DOS	Department of Statistics Malaysia
DSM-IV-TR	Diagnostic and Statistics Manual of Mental Disorders Fourth Edition – The Revised
FEP	First Episode Psychosis
GAF	Global Assessment of Functioning
ICF	International Classification of Functioning
MATRICES	Measurement and Treatment Research to Improve Cognition in Schizophrenia
NMHR	National Mental Health Registry
NMHS	National Health and Morbidity Survey
PANSS	Positive and Negative Syndrome Scale
PSP	Personal and Social Performance Scale
RBANS	Repeatable Battery for the Assessment of Neuropsychological Status
RCT	Randomised Controlled Trial
SOFAS	Social and Occupational functioning Assessment Scale
TAU	Treatment as usual
UKMMC	Universiti Kebangsaan Malaysia Medical Centre
WHO	World Health Organization
WL	Wellness Programme



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# CHAPTER 1

## INTRODUCTION

This chapter discusses the background of the study and defines the problem of interest in the study. It also explains the significance of the study, research objectives, hypotheses and the conceptual framework of this study.

### 1.1 Background

Psychosis is defined as a mental disorder characterized by different degrees of loss of contact with reality and followed by deterioration of normal social functioning that up to some extent some may affect activities of daily living (ADLs). The most common form of psychosis is schizophrenia (NICE, 2002).

Schizophrenia is one of the most prominent forms of mental illness. It is a chronic and persistent mental disorder that is the most debilitating psychiatric condition worldwide (Hogart, Flesher, Ulrich, Carter, Greenwald, Pogue-Geile et al., 2004). Risk of having schizophrenia is ten times greater in relatives of individuals with schizophrenia as compared to the general population. According to American Psychological Association (2001), relatives with schizophrenia may have increased risk for other psychotic disorders.

Life-time prevalence of psychosis is estimated at 0.7% (McGrath et al., 2008). More than 8% of individuals aged 18 or older in the United States, or approximately 17.5 million people, have serious mental illness, resulting in significant functional impairment in their daily lives (Substance Abuse and Mental Health Services Administration, 2003). The onset of psychosis is generally at a young age, where most of the males are affected in the late teens and most of the females in their late twenties. Serious mental illness encompasses a group of disorders that result in substantial functional impairments in one or more major life activities (Kessler et al., 2003).

Psychosis can be associated with other psychiatric conditions such as depression (Marshall & Rathbone, 2011; Cotton et al., 2011; Hasan et al., 2011), anxiety (Achim et al., 2011, Bayle et al., 2011), post-traumatic stress disorder (Strauss et al., 2011; Newman et al., 2010), personality disorder (Yu et al., 2011), and substance misuse (Bennett et al., 2011; Turkington et al., 2009; Donoguhe et al., 2010).

According to the National Health and Morbidity Survey 2015, there has been an increasing trend of the prevalence of mental health problems among adults in Malaysia. The percentage rose from 10.7% in 1996 to 29.2% in 2015 (NHMS, 2015) research



interest involving schizophrenia in Malaysia has grown steadily. The National Mental Health Registry (NMHR) for schizophrenia was formed in 2003. According to the National Mental Health Registry Report from 2003 to 2005, a total number of 7351 cases of schizophrenia has been registered (NHMS, 2005). Majority of the cases reported were males (more than 60% cases), and males typically develop illness earlier than females. Most of schizophrenia patients have impairment in cognitive and social functioning and this is known to cause distress not only to the patients themselves but also to the caregivers. The median age of onset for the first episode of psychosis is early twenties for men and late twenties for women (American Psychiatric Association, 2000).

Schizophrenia as defined in the DSM-IV-TR, is a condition that last for at least six months, includes at least one month of active-phase symptoms, that is, two or more of the following: delusions, hallucinations, grossly disorganized or catatonic behavior, disorganized speech, and/or negative symptoms such as affective flattening, avolition (American Psychiatric Association, 2000). Thus symptoms of schizophrenia are classified as positive and negative. Affective flattening is a limited range in the expression of emotion that includes a lack of facial expression, limited use of body language, and poor eye contact. Avolition is diminishing in the ability to initiate and maintain goal-directed activity. Decrease in energy and interest explains further about avolition, resulting in deficits in areas such as work, hygiene, or school (Andreasen, 1982). Poverty of speech, or known as alogia, is evidenced by a decrease in the production of speech. Poverty in the content of speech and latency in responses may be present. The positive symptoms include an excess or distortion of function, for example hallucinations, delusions and disorganized speech, whereas negative symptoms signify a loss of functioning (American Psychiatric Association, 2000) such as restricted facial expressions or affective flattening, alogia or poverty of speech.

Cognitive impairment is a core feature of schizophrenia that is fully evident at the time of first episode and the most affected areas are attention, verbal memory and executive functioning. Impairment in these cognitive components has been shown to have prognostic value, in essence predicting whether a person with schizophrenia will be able to meet functional goals (Green et al., 2004). Cognitive deficits in schizophrenia influence functional outcomes in work, independent living, social functioning and illness management (Medalia & Choi, 2009). Cognitive deficits also make it difficult to succeed at work, school and daily living tasks as most jobs require people to multi-task and prioritize information, and this requires memory, organization and attention. Hence, people with memory and attention problems tend to struggle with independent living tasks.

There has been a growing emphasis on early detection and intervention in order to delay the onset of psychosis. First episode often commences when a person is in their late teens and 20s (Kirkbride et al., 2006). Thus early identification of schizophrenia in patients with a first episode psychosis (FEP) is important to avoid delay in initiating treatment. This may enhance long-term outcome by addressing issues such as family network, functional and symptomatic outcome and treatment adherence (Ramirez et al.,

2010). As mentioned before, substantial cognitive deficits have been observed in all phases of psychosis, beginning in the pre-morbid period and throughout life (Seidman et al., 2010). Thus, individuals experiencing their first episode psychosis exhibit cognitive deficits that are often equivalents to those seen in patients with a more chronic course of illness (Bilder et al., 2000; Addington and Addington, 2002). They may also exhibit generalized cognitive impairment with evidence of relatively selective impairment in memory, attention and information processing speed, and executive function (Fitzgerald et al., 2004; Bilder et al., 2000).

For the past decades, longitudinal studies of cognition in first episode psychosis patients provide extremely useful information. They provide adequate and realistic baseline measure of cognitive performance and psychopathology symptoms. (Bozikas and Andreou, 2011). Significant and measurable cognitive symptoms are present at the onset of the disease and these remain stable in the subsequent period between 2 and 5 years. Their deterioration however can increase with the course of the disease, especially in inpatients (Ojeda et al., 2007).

Pharmacological and psychosocial interventions for cognitive impairments have been investigated from 1990s but two approaches have become prominent. First, is the attempt to find new antipsychotics which have improved side-effect profiles than both typical and atypical antipsychotics, but are also efficacious in treating cognitive symptoms. Secondly, recent advances in psychosocial interventions have produced new cognitive rehabilitation as a new treatment option called Cognitive Remediation (CR) which is the main focus of the current study.

Early works on cognitive rehabilitation have emerged in the early 1970s (Meichenbaum and Cameron, 1973). The techniques have evolved greatly from the 1990s and sporadic works have proliferated in Europe (Olbrich and Mussgay, 1990, Hermanutz and Gestrich, 1991, Sartory et al., 2005, Wykes et al., 1999), the United States (Belluci et al., 2002, Medalia et al., 1998, Penades et al., 2006) and in Australia (Hodge et al., 2008, Delahunty and Morice, 1996, Delahunty et al., 1993). The effectiveness of these programmes have become increasingly obvious and more recent meta-analyses (Twamley et al., 2003, McGurk et al., 2007b, McGurk, Twamley, Sitzer et al., 2007, Wykes et al., 2011).

## **1.2 Problem statement**

Psychosis has a low prevalence with a median period prevalence of 3.3 per 1000 persons (Elamin et al., 2008). However, psychosis has globally been ranked as the 11<sup>th</sup> leading cause of disability in 2013 (Vos et al., 2015) and it is considered as a highly debilitating disease. The pronounced effect, especially on the psychosocial functioning and quality of life and its long term effect in the development of other diseases are of concern. Psychosis is also associated with significant economic burden with both signified as a growing public health treat (Teoh et al., 2017).

In 2015, the total estimated number of treated schizophrenia cases in Malaysia was 15,104 cases with the total economic burden of USD 100 million, which was equivalent to 0.04% of the national gross domestic product. This suggests that the average cost per patient was USD 6,594 (Teoh et al., 2017). Out of the total economic burden of schizophrenia, 72% was attributed to indirect cost, costing at USD 72 million, followed by 26% of direct medical cost equivalent to USD 26 million, and 2% of direct non-medical cost, costing at USD 1.7 million. Due to this economic burden of schizophrenia, it is known that the largest proportion of the cost of schizophrenia came from the productivity loss mainly associated with unemployment and informal care provided by patients' family and friends.

Besides that, it is known that patients who have been diagnosed with first episode psychosis experienced deficits in functional outcome and has shown deterioration in their symptoms. In line with the principles of treating other psychiatric disorders, it is believed early identification and intervention will result in higher likelihood of reduction of symptoms and better improvement of their functional outcomes and in first episode psychosis.

Whilst it has been agreed that the treatment of schizophrenia should not be limited to medications; pharmacological treatment is still known to be the main approach treating schizophrenia and other psychotic disorders. The target of the antipsychotics drug has been to reduce the positive symptoms of psychosis. The traditional treatment has been concentrating on antipsychotic which is not from most of the time, the quality of life has been limited, that symptoms of schizophrenia remains, not improving. Then come out with tackling the cognitive functions of patients. Medications has been try but with limited success.. Nonetheless, there has been limited evidence regarding the effects of these treatments on addressing cognitive deficits amongst the patients. As such, although pharmacotherapy may be effective in reducing positive symptoms and negative symptoms, but have limited success in ameliorating cognitive deficits. Therefore, psychosocial treatments are needed to enhance the outcomes of treatment.

Psychosocial treatments are designed to help prepare persons with schizophrenia to cope with their illness, achieve higher levels of independence and strive for a better quality of life. Results of psychosocial treatments with schizophrenia populations were varied in the sense that improvements were seen, however, treatments were quite lengthy and effects did not last (Hogarty & Flesher, 1999; Penn & Mueser, 1996).

Research has established the effectiveness of psychosocial interventions. Cognitive rehabilitation, such as CRT is a treatment intervention to improve cognitive functioning of persons with schizophrenia by improving cognitive abilities (Hogarty et al., 2004; Medalia & Richardson, 2005; Trower, Birchwood, Meaden, Byrne, Nelson, & Ross, 2004; Wykes et al., 2002). Patients have reported improvement on their daily living functioning and positive and negative symptoms of schizophrenia (Wykes and van der Gaag, 2001; Pilling et al., 2002; McGurk et al., 2007). General improvement of

functional outcomes for person with schizophrenia has been the main focus of research on CRT.

However, CRT in Malaysia is still considered as a new treatment in intervening the first episode psychosis patients. The reasons why this study involved the First Episode Psychosis (FEP) patients is because the FEP population has not yet been studied. We believed that we would highly see the cognitive and psychosocial improvements in the patients as they were young people and also to combat the issue of unemployment and productivity loss among these young FEP patients. To date, there are only a few hospitals in Malaysia offer and provide this treatment to the patients. A study by Alwi et al. (2009) who had conducted the CRT programme in few hospitals in Malaysia had shown promising outcomes and found that CRT have good prospect as promising preliminary results revealed improvement in cognitive functioning in patients with schizophrenia. Thus, it makes CRT as one of the evidenced-based treatments for schizophrenia and it is consistent with findings from the Western countries (Wykes & Van der Gaag, 2001; Penades et al., 2006; Kurtz et al., 2007).

Nevertheless, effectiveness of CRT specifically in treating the patients with first episode psychosis in Malaysia is still unknown. As we believed that there is no study in Malaysia has been targeting these pool of population

### **1.3 Significance of the study**

This study explores the effectiveness of cognitive remediation therapy in patients with first episode psychosis. It is a study to focus on individual therapy for participants with first episode schizophrenia with a short duration of illness (less than 3 years). These groups of patients are believed to be within a 'critical period' in which early treatment may alter the long-term trajectory of psychosis. Many studies have found that this group may have more severe cognitive deficits which if alleviated might change the course of disorder (Rund, 1998; Hoff et al., 1996; Cornblatt et al., 1998; Kravariti et al., 2003). Besides, aiming at expanding the programme to benefit patients with schizophrenia in Malaysia, this research is hope to give benefit to clinical psychologists, psychiatrist, social workers, nurses, occupational therapist on further information about starting and conducting this therapy. Besides, it is hope that this research would be able provide a more cost-effective intervention than the standard treatment for schizophrenia.

### **1.4 General descriptions of the study**

This study consists of two phases. Phase one of the study was a validation study to establish the psychometric properties of the Brief Assessment of Cognition – Malay version (BACS-M) among patients with schizophrenia in Hospital Kajang. Phase two of the study was a quasi-experimental study of the effectiveness of Computerised

Cognitive Remediation Therapy (CCRT) on cognitive and psychosocial outcomes between two groups involving first episode patients receiving CCRT in Hospital Kajang and control group receiving Wellness Program in UKM Medical Centre.

## **1.5 Research questions**

In achieving the research objectives, there are two main research questions to be addressed as follows

1. Does cognitive remediation therapy improve cognitive and psychosocial functioning in first-episode psychosis patients?
2. Are there any differences in cognitive outcomes between first-episode psychosis patients undergoing CRT and those who received Wellness treatment?

## **1.6 Objectives of the study**

### **1.6.1 General objective**

The general objective of this study was to implement and evaluate the effectiveness of CCRT as compared to WL on cognitive and psychosocial functioning in individuals with first episode psychosis.

### **1.6.2 Specific objectives**

The specific objectives of this study were to:

1. To assess the psychometric properties of the Brief Assessment of Cognition in Schizophrenia – Malay version (BACS-M) in Malaysian population.
2. To determine the baseline socio-demographic characteristics such as gender, ethnicity, marital status and education level of participants in the intervention and control group.
3. To compare the cognitive functioning within group at baseline, post-treatment and 3 months follow-up.
4. To compare the psychosocial functioning within group at baseline, post-treatment and 3 months follow-up.
5. To compare the cognitive functioning between CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.
6. To compare the psychosocial functioning between CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.
7. To compare the psychopathology between CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.



## **1.7 Research hypotheses**

1. There is a significant mean difference of cognitive functioning within group at baseline, post-treatment and 3 months follow-up period.
2. There is a significant mean difference of psychosocial functioning within group at baseline, post-treatment and 3 months follow-up period.
3. There is a significant mean difference of cognitive functioning between the CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.
4. There is a significant mean difference of psychosocial functioning between the CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.
5. There is a significant mean difference of psychopathology between the CCRT and WL groups at baseline, post-treatment and 3 months follow-up period.
6. The computerised cognitive remediation therapy is effective in improving cognitive and psychosocial functioning in first episode psychosis patients.

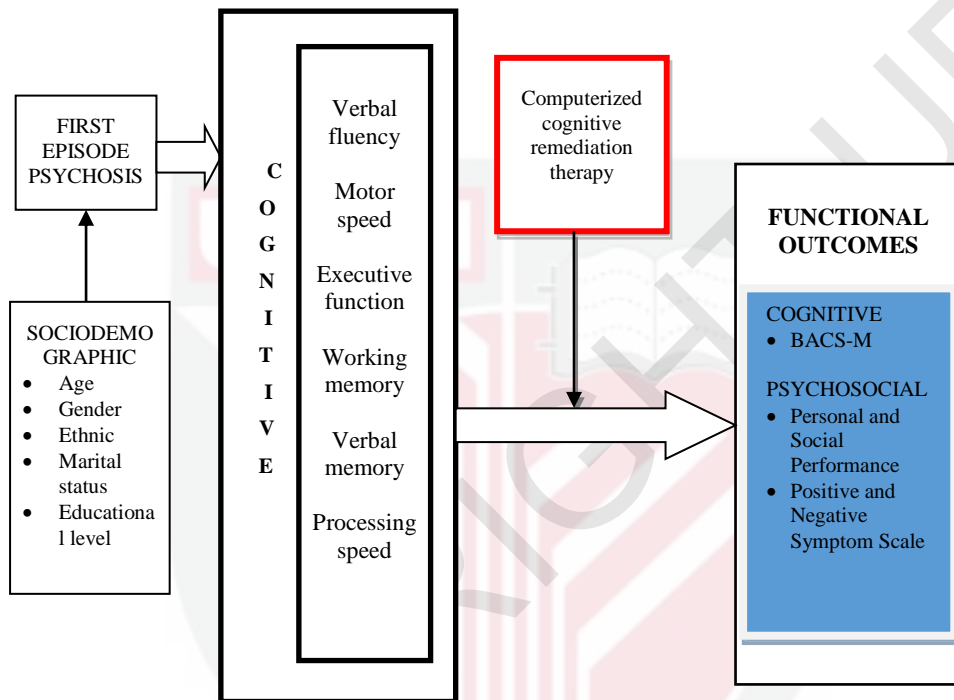
## **1.8 Conceptual Framework**

Figure 1 shows the conceptual framework of this study. The development of first episode psychosis has been known to be multi-factorial in origin. Numerous factors such as genetic, low quality of life and stressful life events such as financial constraint, school bullying and unhappy relationship with family contribute to higher likelihood of developing first episode psychosis.

For a person with first episode psychosis, the associated cognitive deficits challenge his/her ability to effectively and efficiently participate in social systems, and thus, limits the person's psychosocial functionality. Cognitive domains measured in the current study involved component of six domains such as the verbal fluency, motor speed, executive functions, working memory, verbal memory and processing speed. It is hypothesized that once the first episode psychosis participants receive the computerized cognitive remediation therapy as a treatment, then the changes in their cognitive functioning as well as psychosocial functioning will be seen and will have tremendous effect in the lives of the FEP participants.

It is possible that increasing the cognitive functioning of this person through participating in cognitive remediation therapy may increase his or her overall functional outcomes. Furthermore, such results would not only be beneficial to the individual, but to each social system in which the individual may be better able to

participate. Thus, it is believed that intervention targeting the cognitive and psychosocial domains would be beneficial to the person with first episode psychosis.



**Figure 1: A conceptual framework of the factors involved on the relationship between cognitive functioning and the functional outcomes**

## **1.9 Definition of terms**

Some of the terms used in this study require a more detailed definition. These definitions are necessary in order to enhance understanding in the context of the current study. :

### **1.9.1 Psychosis**

Psychosis is defined as a severe mental illness in which emotions and thought are impaired and the person who experienced psychosis may lost contact with reality. Examples of psychoses include schizophrenia, schizophreniform disorder and bipolar disorder. The commonest and the most severe form of psychosis is schizophrenia.

Schizophrenia was first described as “dementia praecox” by Kraepelin ((1896), which connotes “senility of the young” reflected by a variety of symptoms first appearing in adolescence or early adulthood. These symptoms included catatonic postures, attentional difficulties, unusual perceptual experiences, irrational beliefs and inappropriate emotional responses. A common underlying feature of dementia praecox was the deterioration in mental functions. Kraepelin saw this process as neurodegenerative in nature, whereby patients gradually becoming mentally disabled, leading to unproductive lives and never recovered.

### **1.9.2 First Episode Psychosis**

The present study defines first episode psychosis as a psychotic episode which occurs in an individual who presents at a clinical setting with psychosis for the first time and the psychotic episode has occurred in less than 5 years. This may include conditions which may later evolved into either schizophrenia, bipolar disorder or schizoaffective disorder. For the present study, we only included patients who is diagnosed with schizophrenia.

Symptoms may include changes in behavior, moods, cognition, and somatic change. Changes in behaviors are social withdrawal, paranoia, deterioration in social functioning; changes in mood for example mood swings, depression and anxiety; changes in cognition includes odd or unusual ideas, difficulty concentrating; and somatic changes for example loss of appetite and energy, and reduced motivation.



### **1.9.3 Cognitive Remediation Therapy (CRT)**

Cognitive remediation therapy is a psychological treatment designed to improve neurocognitive functioning in patients with schizophrenia. This is achieved through targeting the cognitive domains of attention, working memory, executive functioning and planning for remediation (Wykes et al., 2007). Cognitive remediation of these neuro-cognitive domains has been linked to significant improvements in the quality of life, social functioning, response to traditional rehabilitation programmes and symptom expression in patients with schizophrenia (Vita et al., 2011; Wykes et al., 2011; Kurzban et al., 2010).

CRT is a term describing different methods of teaching “thinking” skills, aiming at enhancing cognitive skills with a further goal that improved cognition will affect psychosocial functioning. CRT uses techniques which have been shown to be effective in modifying cognition in patients with schizophrenia such as errorless learning, repetition and positive reinforcement (Reeder et al., 2006).

### **1.9.4 Computerised Cognitive Remediation Therapy**

Computerized Cognitive Remediation Therapy (CCRT) has been successfully used to treat people with schizophrenia. It focuses on skills development and seek to give patients the tools to function adaptively and independently in society. CCRT uses software programs that are designed to enhance cognition in various domains such as attention, memory, executive functioning through out interactive computer games.

### **1.9.5 Wellness Program**

The wellness Program is a psychoeducational program aimed at healthy lifestyle promotion, targeting the psychosis patients. Research indicated that individuals with psychosis have a greater risk for obesity, coronary heart disease, metabolic syndrome and type 2 diabetes. The most compelling evidence indicates that antipsychotic medications are directly responsible for significant weight gain which leads to diabetes and cardiac complications. Therefore, there are two main components that would be the main focus of Wellness Program which are aerobic exercise (which run by occupational therapist) and healthy eating and lifestyle teaching (run by dietitian).

### **1.9.6 Positive symptoms**

The positive symptoms in schizophrenia can be grouped into the following four categories; hallucinations, delusions, thought disorders and movement disorder. These symptoms usually present at the acute phase of the illness and regarded as a sign of psychosis.

Hallucinations is a symptom characterized by a perceptual experience, occurring in the absence of external stimuli, which can be occur in any sensory modality (auditory, visual) (American Psychiatric Associations, 2000). Patients reported of hearing voices and noises. They sometimes report having 'vision' or smelling things that others do not.

Delusions are false beliefs which are illogical. Generally, the patients may believe that other people can read their mind or control their behaviors. They can also believe that they are a messenger, or an angel or God himself. Moreover, they may believe that they are wealthy, famous and highly intelligent.

Meanwhile, thought disorders are regarded as an unusual way of thinking. The most common manifestation is when patients speak in an incoherent way with no logical connections between statements and occasionally make up words which have no meaning.

The last characteristic of positive symptoms is movement disorder. It is characterized by when a patient either continuously becomes catatonic or repeats a movement and they are unable to move or to respond to any kind of external stimuli.

### **1.9.7 Negative symptoms**

Negative symptoms are characterized by a lack of speech, motivation, socialization, emotional responsiveness and movement. Patients who exhibit significant negative symptoms have poor functional outcome (Wegener et al., 2005; Lysaker et al., 2001).

Negative symptoms are quite common to develop in patients during or after the initial psychotic episode and these symptoms can lead to a loss of an individual's abilities to lead a better functional life (Arango et al., 2004).

### **1.9.8 Cognitive symptoms**

Cognitive symptoms which present before psychosis, and subtle in nature, can sometimes be difficult to be recognized as part of the psychotic disorder. The cognitive deteriorations are only detected through the use of cognitive testing. The Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) Project produces a battery of tests, which was the MATRICS Consensus Cognitive Battery (MCCB), designed to assess treatment effects in clinical trials of patients with schizophrenia (Keefe et al., 2011).

The MATRICS have outlined seven primary domains of cognition that are affected in patients with schizophrenia. These domains are working memory (verbal/no verbal), verbal learning and memory, visual learning and memory, reasoning and problem solving, processing speed, attention/vigilance, and social cognition. Individuals experiencing their first episode of schizophrenia exhibit cognitive deficits. Significant and measurable cognitive symptoms are present at the onset of the disease and these remain stable in the subsequent period between 2 and 5 years.

### **1.9.9 Psychosocial functioning**

Psychosocial functioning refers to activities of daily living such as but not limited to personal hygiene, nutrition, work, and interpersonal skills. Deficits in psychosocial functioning are a core feature of schizophrenia. These deficits include poor social interaction, difficulties in maintaining relationships with family and friends, and/or inadequate performance in the workplace.

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